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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/568,289

08/28/2006

Jin Fujita

.95791

3385

20736 7590 06/12/2007
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EXAMINER

PENG, CHARLIE YU

ART UNIT

PAPER NUMBER

2883

MAIL DATE

DELIVERY MODE

06/12/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/568,289	FUJITA ET AL.	
	Examiner	Art Unit	
	Charlie Peng	2883	

TH

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months' after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8-16, 18-26 and 28-31 is/are rejected.
- 7) ☒ Claim(s) 7, 17 and 27 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 February 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>02/16/06, 08/28/06</u> | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Claim Objections

Claim 4 is objected to because of the following informalities:

“mode filed diameter” on line 7;

“a mode field diameter”, “a light entry side”, “a light exit side” have previous antecedent bases in claim 3 (“its mode field diameter”) and should refer back to the bases.

Claim 5 is objected to because of the following informalities:

“a mode field diameter”, “a light entry side”, “a light exit side” have previous antecedent basis in claim 3 (“its mode field diameter”) and should refer back to the bases.

Claim 6 is objected to because of the following informalities:

the phrase “a single mode fiber” is previously established in claim 1;

the phrase “the graded index fiber” is used to described two distinct fibers in claim 6. They should be designated as first graded index fiber/second graded index fiber, or the like.

Other informalities similar to these listed above appear throughout the claims.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-5 and 8-11 are rejected under 35 U.S.C. 102(a) & (e) as being anticipated by U.S. Patent 7,031,567 to Grinderslev et al. Grinderslev teaches an optical transmission line comprising:

a pair of cable assemblies 100a, 100b;

wherein each assembly has a single mode fiber 102 and a GRIN lens 103 fused to an end of the single mode fiber 102.

A cladding having a refractive index smaller than that of its core is inherent to an optical fiber as it functions via total internal reflection.

With reference to claims 3, 8 and 9, the GRIN lens/collimator 103 "functions either to expand the optical signal from the first diameter as it leaves the fiber 102 to a second diameter or to focus the optical signal from the second diameter to the first diameter for coupling to the fiber. The second diameter is considerably larger than the first diameter." "In a preferred embodiment, the second diameter of the collimated beam is greater than about 20 μm , more preferably, about 30 to about 100 μm , and, even more preferably, about 45 to about 70 μm ." (col. 4, lines 52-63)

With reference to claims 4, 5, 10 and 11, in accordance with rejection to claims 3 above, Grinderslev further teaches: "To achieve the desired second diameter, the length of the GRIN lens needs to be tailored to the pitch (or wavelength) of the optical signal at

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which the connector system is intended to be operated. Specifically, the length of the lens is dictated by the following formula $\text{Length} = 1/4 \text{ pitch} + 1/2n \text{ pitch}$ wherein $n=0, 1, 2, \dots$ When $n = 2$, the length of the GRIN lens would be $1/2$ of a pitch. (col. 5, lines 4-12)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 12-15, 18-25 and 28-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grinderslev et al. Although Grinderslev does not teach using a connector or a V-groove to connect the single mode optical fibers and the GRIN fibers, such modifications have no novelty and would be well within the skill of any ordinary artisan, as using connectors and V-grooves are extremely well known in the art as means of optically coupling several optical fibers. In fact, USPTO has long established several subclasses to address these types of prior art references, such as Class 385, subclasses 55, 65, etc. The examiner hereby takes Official Notice that it would have been obvious to one having ordinary skill in the art at the time the invention was made to using optical connectors or V-grooves as means to coupling optical fibers. The motivation would be to ensure proper fiber-to-fiber alignment.

With reference to claims 13, 18, 19, 23, 28 and 29, the GRIN lens/collimator 103 "functions either to expand the optical signal from the first diameter as it leaves the fiber 102 to a second diameter or to focus the optical signal from the second diameter to the

first diameter for coupling to the fiber. The second diameter is considerably larger than the first diameter." "In a preferred embodiment, the second diameter of the collimated beam is greater than about 20 μm , more preferably, about 30 to about 100 μm , and, even more preferably, about 45 to about 70 μm ." (col. 4, lines 52-63)

With reference to claims 14, 15, 20, 21, 24, 25, 30 and 31, in accordance with rejection to claims 3, 13 and 23 above, Grinderslev further teaches: "To achieve the desired second diameter, the length of the GRIN lens needs to be tailored to the pitch (or wavelength) of the optical signal at which the connector system is intended to be operated. Specifically, the length of the lens is dictated by the following formula $\text{Length} = 1/4 \text{ pitch} + 1/2n \text{ pitch}$ wherein $n=0, 1, 2, \dots$," When $n = 2$, the length of the GRIN lens would be $1/2$ of a pitch. (col. 5, lines 4-12)

Claims 6, 16 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grinderslev et al. as applied to claims 3, 13 and 23 above, and further in view of U.S. Patent 6,485,191 to Sato. Grinderslev teaches the optical transmission line as claimed except for a single mode fiber having an expanded mode field diameter inserted between the GRIN lenses. Sato teaches an optical transmission line comprising a pair of single mode fibers 4a, 4b; a pair of graded index fibers 8a, 8b between the single mode fibers; and further a pair of core enlarged fibers 5a, 5b between the graded index fibers. (Fig. 1) Mode field diameter is a function of fiber core size and larger cores result in larger optical beam width of light within the fiber.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Grinderslev's invention as suggested by Sato by inserting

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one or more single mode fiber with larger mode field diameter between the GRIN lens, since, as Sato indicated, this design allows stabilization of mode field. (col. 7, para. 3)

Allowable Subject Matter

Claims 7, 17 and 27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Grinderslev and Sato teach the optical transmission line except for a second pair of single mode optical fibers inserted between GRIN fibers, wherein the second pair of single mode optical fibers have mode field diameter smaller than the expanded mode field of the GRIN fibers. This limitation has the advantage of shutting off fire spreading toward a light source of the transmission line, i.e., preventing fiber fuse phenomenon. Relevant prior art has not indicated using such a method to solve such a problem, and in fact often use a fiber of same mode field diameter. It is the examiner's opinion that the prior art of record, taken alone or in combination, fails to disclose or render obvious such a single mode optical fiber, in combination with the rest of the limitations of the base claim.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charlie Peng whose telephone number is (571) 272-2177. The examiner can normally be reached on 9 am - 6 pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ Charlie Peng /
Charlie Peng
Patent Examiner
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